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ALEXANDRIA, VA 22314				
EXAMINER				
CHU, CHRIS C				
ART UNIT		PAPER NUMBER		
2815				

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/534,043

Applicant(s)

SHINOHARA ET AL.

Examiner

Chris C. Chu

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3 - 5, 7, 8, 13 and 14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7, 13 and 14 is/are allowed.
- 6) ☒ Claim(s) 1, 4 and 8 is/are rejected.
- 7) ☒ Claim(s) 3 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved or b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The applicant's amendments filed on July 18, 2003 have been received and entered in this office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Berg.

Regarding claim 1, Berg discloses in Fig. 1, Fig. 2, Fig. 5 and column 6, lines 11 ~ 19 a semiconductor module mountable on an external heat sink (112), the semiconductor module comprising:

- an insulating substrate (10, 62 and a structure between wire and 10) for the semiconductor module, the insulating substrate (10, 62 and a structure between wire and 10) including a substrate (10), a first conductive pattern (a structure between wire

- and 10) formed on a first main surface of the substrate which is on the opposite side from the external heat sink, and a second conductive pattern (62) formed on a second main surface of the substrate which is on the same side as the external heat sink and for contact with the external heat sink; and
- a mounting frame (34 and 42) made of metal and having a mounting surface for contact with the external heat sink, the mounting frame (34 and 42) including a flange along a periphery thereof for engagement with a peripheral part of the insulating substrate at the first main surface, the flange pressing the peripheral part of the insulating substrate toward the external heat sink,
 - wherein the mounting frame further includes:
 - a first metal plate (42) having the mounting surface, and
 - a second metal plate (34) disposed directly on and in contact with the first metal plate and having a protrusion along a periphery thereof projecting from a periphery of the first metal plate to define a flange.

As to the language on lines 10 ~ 12 of claim 1, the phrase "to force the insulating substrate into pressure contact with the external heat sink" is functional language which does not differentiate the claimed apparatus from Berg.

Regarding claim 4, Berg discloses in Fig. 5 the insulating substrate (10) further includes a third conductive pattern (a structure between 10 and 34) formed on the first main surface along a periphery of the substrate; and the flange and the insulating substrate contact each other, with the third conductive pattern therebetween.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose et al. in view of Hiyoshi.

Hirose et al. discloses in Fig. 16B and column 10, lines 16 ~ 19 a semiconductor module mountable on an external heat sink (5), the semiconductor module comprising:

- an insulating substrate (1, 11, and 8) for the semiconductor module, the insulating substrate (1, 11, and 8) including a substrate (1), a first conductive pattern (8) formed on a first main surface of the substrate which is on the opposite side from the external heat sink, and a second conductive pattern (11) formed on a second main surface of the substrate which is on the same side as the external heat sink and for contact with the external heat sink;
- a mounting frame (3) made of metal and having a mounting surface for contact with the external heat sink, the mounting frame (3) including a flange along a periphery thereof for engagement with a peripheral part of the insulating substrate at the first main surface, the flange pressing the peripheral part of the insulating substrate toward

the external heat sink to force the insulating substrate into pressure contact with the external heat sink,

- wherein the substrate, the first conductive pattern and the second conductive pattern of the insulating substrate have respective peripheries in alignment with each other, and
- wherein the flange presses the periphery of the first conductive pattern on which a semiconductor element is mounted toward the external heat sink.

Hirose et al. does not disclose an insulative material between the flange and the first conductive pattern. However, Hiyoshi discloses in Fig. 4 an insulative material (53) between a flange (51) and a first conductive pattern. It would have been obvious to one of ordinary skill in the art at the time of the present invention was made to add the insulative material of Hiyoshi in the device of Hirose et al. in order to seal the semiconductor package as taught by Hiyoshi in column 11, lines 45 ~ 54.

Allowable Subject Matter

6. Claims 7, 13 and 14 are allowed (see previous office action).
7. Claims 3 and 5 are objected (see previous office action).

Response to Arguments

8. Applicant's arguments filed on July 18, 2003 have been fully considered but they are not persuasive.

On page 9, applicant argues "in Berg, registration aid 62 does not include any conductive pattern." This argument is not persuasive. Berg states in column 4, lines 27 ~ 44 and column 6, lines 11 ~ 19 heat being conducted from the chip through the substrate to the registration aid ... to a convection heat sink. Also, Berg clearly shows in Fig. 2 and Fig. 5 registration aid 62 having a pattern. Since the registration aid 62 of Berg is made by a conductive material and has a pattern, the registration aid 62 of Berg includes a conductive pattern.

Further, applicant argues "in Berg, ... leads 34 and tabs 42 do not contact heat sink 112." This argument is not persuasive because claim 1 does not specifically claimed that the leads 34 and tabs 42 are directly attached or contacted to the heat sink 112.

Even further, applicant argues "in Berg, ... leads 34 and tabs 42 do not form a flange that presses substrate 10 against heat sink 112." This argument is not persuasive. Berg clearly shows in Fig. 5 leads 34 and tabs 42 having a flange. Also, Berg clearly shows in Fig. 5 the flange pressing the substrate 10 against heat sink 112. Since Berg discloses each and every feature of amended Claim 1, Berg anticipates the amended Claim 1.

Next, applicant argues "in Hirose, metal layer 2, which would not be regarded as a conductive pattern by an ordinarily-skilled artisan, has a periphery aligned with a periphery of metal layer 11 and is pressed by fixing jig 3 toward heat radiating plate 5." This argument is not

persuasive. Hirose states in column 8, lines 61 ~ 65 that the metal layer 2 ... and conductive layer 8 in case 10 are of the same material, for example, copper, the metal layer 2 at the fixing portion can be formed simultaneously with the conductive layer 8 of the current controlling unit. Thu, the metal layer 2 is a portion of the conductive layer 8. Therefore, the metal layer 2 is a portion of a conductive pattern by an ordinarily-skilled artisan. Since Hirose discloses a conductive pattern (2) that is a periphery aligned with a periphery of metal layer 11 and is pressed by fixing jig 3 toward heat radiating plate 5, Hirose teaches claim 8.

Next, applicant argues "Hiyoshi does not disclose an insulative material between a flange and a first conductive pattern, as recited in claim 8, and does not remedy the deficiency of Hirose with regard to this feature." This argument is not persuasive because Hiyoshi discloses in column 11, lines 45 ~ 54 sealing members or sealing rubbers (sealing rings) 53. In other words, the material of element 53 in Hiyoshi is an insulative material. Since rubber or elastomer is insulating material, the element 53 in Hiyoshi is an insulative material. Therefore, Hiyoshi discloses in Fig. 4 an insulative material (53) between a flange (51) and a first conductive pattern (the conductive element on top of 31), as recited in claim 8.

Finally, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071,

5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation was established by Hiyoshi in column 11, lines 45 ~ 54 to seal the semiconductor package.

For the above reasons, the rejection is maintained.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
September 30, 2003



EDDIE C. LEE
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RECEPTIONIST: (703) 308-0956